

Terms of Reference of the Task Team on GSRN (GSRN-TT)

1. Background

The Global Climate Observing System (GCOS) and the WMO Integrated Global Observing System (WIGOS) both recommend that networks should be part of a tiered system: reference, baseline and comprehensive (Manual on the WMO Integrated Global Observing System, appendix 2.1 (WMO-No. 1160). Presently, for land surface meteorological observations, there exists baseline and comprehensive networks, but there is no reference network.

GCOS has been working since 2015 on establishing a GCOS Surface Reference Network (GSRN) that will deliver the reference component of the tiered system for surface observations. A paper in the International Journal of Communication (IJOC), (Thorne et al., 2018) provides the scientific rationale. The relevant report GCOS-226 provides details on how it is presently envisaged to implement the GSRN and outlines the next steps required for the implementation of a GSRN. It calls for the establishment of a lead centre sufficiently resourced and empowered to manage the rollout of such a global network and an oversight group, comprising a broad range of scientific and technical experts that will provide guidance on the development of the GSRN and ensure integration with relevant activities.

The paper on “Developing reference observing networks and long-term observing stations”, drafted by the former CCI Rapporteur and team, which aims at integrating existing definitions and practices into WIGOS framework regulations, will also be taken into consideration.

2. Work plan

Under the leadership of the GCOS Steering Committee and of the INFCOM Standing Committee on Earth Observing Systems and Monitoring Networks (SC-ON), and in close collaboration with the Standing Committee on Measurements, Instrumentation and Traceability (SC-MINT), the task team will be responsible for the initial implementation of the GSRN and as such shall undertake necessary activities to instigate the network as follows:

Network governance

- (1) Establish an initial network governance and the organizational structure of the GSRN, including identifying the appropriate liaison with WMO and GCOS to ensure that GSRN operations are well aligned with their requirements;
- (2) Ensure that the GSRN is the reference component of a tiered system: reference, baseline and comprehensive networks for the land surface-based observing system component;
- (3) Develop provisions of the *Manual on the WMO Integrated Global Observing System*, (WMO-No. 1160) regarding the implementation of the GSRN;
- (4) Liaise with relevant groups and national and international bodies, including the International Bureau of Weights and Measures (BIPM), to ensure that the GSRN is fit for purpose, robust and has the required long-term commitment and management structures;
- (5) Develop ToR for the lead centre for GSRN;
- (6) Report annually on progress to the GCOS Atmospheric Observation Panel for Climate (AOPC) and the GCOS Terrestrial Observation Panel for Climate (TOPC) at their panel meetings and, provide an annual report to GCOS Steering Committee and to the Standing Committees of the Infrastructure Commission;

- (7) Finalize the document “Climatological reference stations: definitions and requirements” and particularly address the following points:
 - a. Explore integration of the GSRN and CRS concepts, and clarify/separate requirements for observing networks from those for observing stations;
 - b. Contribute to the higher-level SC-ON discussion on tiered networks;
 - c. Decide how the document *Climatological reference stations: definitions and requirements* should be published.

GSRN Network initiation

- (7) Define a work plan and milestones including an implementation plan for the establishment of the GSRN according to the guidance in GCOS-226, including a timeline;
- (8) Finalize and agree requirements for GSRN sites (taking into account the document “Climatological reference stations: definitions and requirements”), including:
 - a. Measurement protocols;
 - b. Reliable data transfer;
 - c. Metadata retention;
 - d. Consistency with the Measurement Quality Classifications for Surface Observing Stations on Land (Decision 6 (INFCOM-1)) and the Siting Classification for Surface Observing Stations on Land (WMO n.8 Vol1, Ch1, Annex 1.d) and the integration of these requirements into WMO-1160.
- (9) Develop guidelines for a pilot project that will include a small set of existing stations suitable for designation as GSRN sites;
- (10) Develop guidance on the certification process to be adopted for GSRN stations that aligns with the guidelines provided by the *Guide to Instruments and Methods of Observation*, (WMO-No. 8);
- (11) Develop a proposal for the initial composition of the GSRN, including a process for nomination, review and site certification;
- (12) Provide scientific, technical and management guidance to the lead centre, which will manage the overall work and evolution of the network, and which shall formally report to the GSRN Task Team.

3. Duration and final report

The task team will be constituted for a period of 4 years after which it shall provide a substantive report on progress to date with recommendations around continuation options for GSRN including appropriate long-term governance options. This report shall be delivered to GCOS, SC-ON and SC-MINT.

4. Membership

Membership shall consist of:

- Two co-chairs, one to be nominated and agreed by SC-ON and the other by SC-MINT;
- No more than 8 ordinary members to be selected for their diverse skill sets by the task team chairs with due regard to gender balance and regional association representation;
- Additional representatives to be nominated one each from the following stakeholders who shall serve in an ex-officio capacity but have equal membership standing:
 - Representatives of SC-ON, including representatives of the Joint Expert Team on Earth Observing System Design and Evolution (JET EOSDE), the Standing Committee on Measurements, Instrumentation and Traceability (SC-MINT), and the Standing Committee on Information Management and Technology (SC-IMT);
 - 3 members of the former CCI team on “Developing reference observing networks and long-term observing stations”;
 - Representatives of AOPC and TOPC;
 - A representative of BIPM (International Organization established by the Metre Convention);
 - A representative of GRUAN (GCOS Reference Upper-Air Network);
 - A representative of GSN (GCOS Surface Network);
 - A representative of GCW (Global Cryosphere Watch);
 - A representative of the satellite community;
 - The Director of the lead centre (once it has been constituted);
 - A representative of HMEI (The Association of Hydro-Meteorological Equipment Industry).

5. Budget

TBC - but should permit at least one in-person meeting.

6. Modalities of work

The task team shall work primarily by remote means and be facilitated by GCOS and the INFCOM Secretariat in their activities. At least one face-to-face meeting shall be convened (budget permitting).